UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/856,982	05/30/2001	Yoshio Yanase	2001-0615A	6344

513 7590 06/03/2003

WENDEROTH, LIND & PONACK, L.L.P.
2033 K STREET N. W.
SUITE 800
WASHINGTON, DC 20006-1021

EXAMINER
NGUYEN, SANG H

ART UNIT	PAPER NUMBER
2877	

DATE MAILED: 06/03/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/856,982	YANASE ET AL.	
	Examiner	Art Unit	
	Sang H Nguyen	2877	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *26 March 2003* .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *21-45* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *21-25,27-29,32-39 and 41-43* is/are rejected.

7)☒ Claim(s) *26,30,31,40,44 and 45* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Response to Amendment

1. The present Office action is made in response to Amendment "B" in Paper No. 10 filed on 03/26/03. It is noted that the present application contains claims 21-45 and claims 1-20 have been canceled by the Amendment "B".

Drawings

2. The proposed drawing correction to figures 12-13, filed on 03/26/03 have been received by the Office and also approved by the Examiner.

Specification

3. The substitute specification filed on 03/26/03 has been received by the Office, and also approved by the Examiner. The substitute specification is now entered into the present application.

4. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless -
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 21-25 and 27-29 are rejected under 35 U.S.C. 102(b) as being anticipated by Fossey et al (U.S. Patent No. 6,292,259).

Regarding claims 21, 23, and 27; Fossey et al discloses a method for inspecting a semiconductor wafer surface (W of figure 3), comprising the step of:

* scanning a wafer (W of figure 3) with a laser beam (figure 3) from an inspection system (20 of figure 1) having a laser inspection (81 of figure 3);

* detecting a scattered light or reflected light (figures 3 and 6) from the wafer surface (W of figure 3) by multiple light optics (121,122, 123,124, 125, 126 of figure 3), wherein the multiple light optics (121,122, 123,124, 125, 126 of figure 3) having different detecting angles (a,b,c of figure 3) to an incident light (figures 3 and 6 and col.7 line 6 to col.8 line 24); and

* determining a type of occurrence of particle defects and pit defects (col.11 lines 10-35, for example, the ratio of the intensity of the signal from center channel detector [124 of figure 1] to the signal from back channel detector [126 of figure] is less than a predetermined constant 1.14, then defect is **classified or typed** as a particle defect. Otherwise, the ratio of the intensity of the signal from center channel detector [124 of figure 1] to the signal from forward channel

detector [122 of figure] is more than a predetermined constant 1.14, then defect is **classified or typed** as a pit defect) and a shape of occurrence of particle defects and pit defects (col.10 lines 11-12, and 43-64, for example, the shape of occurrence is considered to be a **convex shape or a concave shape** is difference in the shape of the scatter curves for pits and for particles) on the surface (S of figure 1) of the wafer (W of figure 1) based on the ratio of light intensities from multiple optics (123,121,125) by a the surface inspection system (20 of figure 1) having a system controller 50 of figures 1-2).

Regarding claim 22; Fossey et al discloses a laser surface inspection apparatus considered to be the inspection system (20 of figure 1) having at least two light optics (121,122, 123,124 of figure 3).

Regarding claims 24-25 and 28-29; Fossey et al discloses types of defects as particles or other debris and pits or "COPS" (col.1 lines 20-37) are determined depending on a combination of A, B, and a value given by A/B, wherein the light intensity of particle conversion size of a light point defect detected in a high angle optical is defined A, while the light intensity of particle conversion size of a light point defect detected in a low angle light optic is defined B (col.7 lines 25-57 and col.11 lines 10-35).

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. Claims 32-39 and 41-43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fossey e al (U.S. Patent No. 6,292,259) in view of Ravid et al (U.S. Patent No. 6,256,093).

Regarding claims 32-39 and 41-43; Fossey et al discloses all of features in claimed invention as claim 22 except for a difference between a horizontal length and a vertical height of a light point defect present on a surface of the semiconductor wafer and a difference between two orthogonal horizontal lengths of a light point defect present on a surface of the semiconductor wafer. However, Ravid et al teaches that it is known in the art to provide a difference between a horizontal length and a vertical height of a light point defect present on a surface of the semiconductor wafer and a difference between two orthogonal horizontal lengths of a light point defect present on a surface of the semiconductor wafer by an analyzer (34 of figure 2 and col.3 line 43 to col.4 line 15). See figures 1, 3A, 4, and 6.Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify a method for inspecting a semiconductor wafer surface of Fossey et al with a difference between a horizontal length and a vertical height of a light point defect present on a surface of the semiconductor wafer and a difference between two orthogonal horizontal lengths of a light point defect present on a surface of the semiconductor wafer as shown in the method of Ravid et al for the purpose of determining and classifying defects on the surface of the wafer.

Allowable Subject Matter

Claims 26, 30-31, 40, and 44-45 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

9. Applicant's arguments with respect to claims 21-45 have been considered but are moot in view of the new ground(s) of rejection.

10. Applicant's arguments filed 03/26/03 have been fully considered but they are not persuasive.

Applicant argued that Fossey et al does not disclosed determining a type and approximate shape of occurrence associated with the semiconductor wafer based on a ratio of the light intensities from the multiple light optics.

This argument is not persuasive. Fossey et al discloses determining a type of occurrence of particle defects and pit defects (col.11 lines 10-35, for example, the ratio of the intensity of the signal from center channel detector [124 of figure 1] to the signal from back channel detector [126 of figure] is less than a predetermined constant 1.14, then defect is **classified or typed** as a particle defect. Otherwise, the ratio of the intensity of the signal from center channel detector [124 of figure 1] to the signal from forward channel detector [122 of figure] is more than a predetermined constant 1.14, then defect is **classified or typed** as a pit defect) and a shape of

occurrence of particle defects and pit defects (col.10 lines 11-12, and 43-64, for example, the shape of occurence is considered to be a convex shape or a concave shape is difference in the shape of the scatter curves for pits and for particles) on the surface (S of figure 1) of the wafer (W of figure 1) based on the ratio of light intensities from multiple optics (123,121,125) by a the surface inspection system (20 of figure 1) having a system controller 50 of figures 1-2).

Conclusion

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

12. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Sang Nguyen whose telephone number (703)308-6426. The examiner can normally be reached on Monday through Friday from 8:30 am to 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor. Mr. Frank Font, can be reached on (703)308-4881. The fax phone number for the organization where this application or proceeding is assigned is (703)308-7722 or 7724.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)308-0956.

SN

Nguyen/ sn

May 20. 2003

Frank G. Font
Supervisory Patent Examiner
Art Unit 2877
Technology Center 2800